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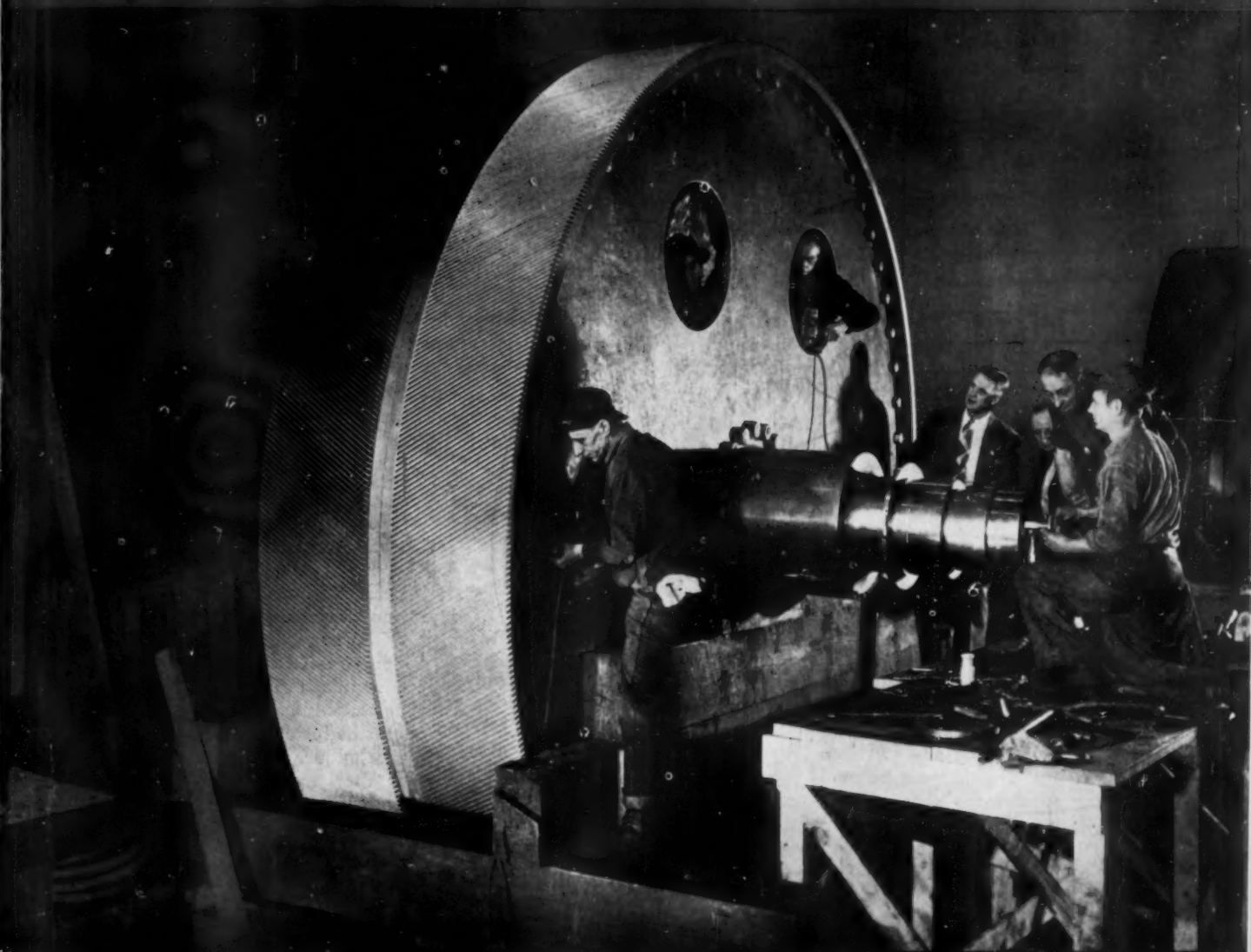
TECHNOLOGY DEPT.

SCIENCE NEWS LETTER

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AUG 31 1944

THE WEEKLY SUMMARY OF CURRENT SCIENCE • AUGUST 26, 1944



"Mainspring"

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A SCIENCE SERVICE PUBLICATION

ORDNANCE

Gunsight For Planes

Gyro instrument can be used in aerial combat at ranges of over 400 yards while both planes are speeding at 400 miles an hour.

► A FAR CRY from the ordinary ring-and-bead sight used on both sportsmen's guns and aircraft weapons is the new British gyro gunsight. Air combat gunners may now open effective fire on their opponents with the speed of each plane around 400 miles an hour, at ranges of over 400 yards and angles of deflection which were considered impractical until a few months ago.

The gyro gunsight, designated the Mark 11-D, combines the best qualities of reflector and computer gunsight types. The new gunsight, like the T-1 bomb-sight, consists of a computer and a sighting head. It eliminates the need for lining up the gunner's eye, front and rear sights, and the target.

The sight itself actually projects an image of the enemy plane on a transparent glass screen or sight reflector, along with the aiming ring of six diamonds arranged in a movable circle around a center spot. This new aiming ring, instead of being fixed, can be made larger or smaller in diameter at the will of the gunner.

AERONAUTICS

Flutter in Planes Recorded

► A NEW self-contained flight vibration recorder, so lightweight that it can be comfortably held on the lap of the observer, makes possible the rapid study of airplane vibration and flutter during flight. It can be installed and put into use within half a day, and can be used to check or supplement data secured with more elaborate equipment, weighing up to 500 pounds, that takes about two weeks to install.

The new recorder, designed like a cathode-ray oscillograph, was developed by the Technical Development Division of the Civil Aeronautics Administration, under the direction of Albert London, and is being manufactured commercially by the Brown Instrument Company of Philadelphia.

Flutter is an aeronautical engineer's way of referring to a vibration of any part of an airplane. It may occur periodically and be of indefinite duration. The

On going into attack, the aerial gunner adjusts the diameter of the aiming ring so that the wingspan of the enemy plane is contained within the diamond circle. By turning a lever on the computer he informs the sight of the type of aircraft he is attacking. By turning a twist grip on the computer he notifies the computer of the range at which he is attacking. This information is automatically fed to the sighting head by variable electric currents.

As he approaches the target, the gunner increases the size of the aiming ring. The sight is now correctly adjusted for the gunner to fire his guns and register hits.

Combat results, reports the British Air Commission, show that the fighter aircraft are now destroying nearly twice the number of Luftwaffe aircraft since the introduction of the new gunsight.

The Mark 11-D gunsight was conceived and developed at the Ministry of Aircraft Production Experimental Establishment in England.

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repeated blows to which an airplane in flight is subjected by air movements and disturbances creating an unsteady airflow over any part of the plane is a good example of flutter. It may also be caused by the improper functioning of a part of the plane's structure. If flutter cannot be corrected, it may cause serious damage.

Flutter can be, and in most cases is, avoided in designing planes. It rarely appears in the first model in any severe form, especially in large planes. Sometimes it appears in later models after months of use where it did not exist in the original model.

The new recorder can study flutter in many locations about the plane through pickups placed at many places throughout the structure, such as motor mounts, cowlings and small accessories.

The vibration recorder contains its own batteries, amplifier, electronic switch,

cathode ray tube and a means for observing the record on a screen. There is also a camera for photographing the screen, thus permitting a permanent visual record of the test.

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INVENTION

Ultra-Short Radio Waves Used for Sterilization

► VACCINES, serums and other medicinal materials are often supplied nowadays in ampoules made of plastics instead of glass. This imposes a problem in sterilization, for the customary heat treatment would soften and ruin some of the plastics.

The problem has been met by Rex E. Moule of Dayton, Ohio, by placing the ampoules between terminals sending out intense beams of ultra-short radio waves, on the order of 50,000 cycles a second. This effectually sterilizes the contents without affecting the plastic walls of the ampoules.

Rights in Mr. Moule's patent, No. 2,355,887, have been assigned to the General Motors Corporation.

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METALLURGY

Steel Mills Mining Own Slag for Scrap Metal

► STEEL FOR war is being mined from old slag heaps around smelting plants. These mountains of forbidding waste contain considerable quantities of good scrap metal, cast aside in the less efficient operation of earlier days but now capable of recovery and re-use.

A method and plant set-up for this purpose has been developed by Eric H. Heckett of Titusville, Pa., who has been awarded U. S. patent 2,352,712. The method is an improvement of his earlier technique.

Steel occurs as lumps or nuggets embedded in the matrix of the slag, like raisins in a cake. The slag is pounded loose by dropping ponderous weights on it and by other simple mechanical means. A magnetic separator lifts out the steel chunks, and the broken slag is hauled off for road-surfacing or other mass uses.

The recovered steel scrap is screened into two sizes. The smaller pieces, from an inch or so in diameter down, are fed into the blast furnaces; adhering slag simply becomes a part of the flux. Larger pieces are charged directly into open-hearth furnaces.

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CHEMISTRY

Postwar Furnace

Radically different from conventional anthracite furnaces, the combustion chamber of the new device is a plain horizontal steel tube fed by a mechanical "worm."

► COAL-SAVING, space-saving, labor-saving are the three principal characteristics of a new anthracite-burning heating equipment for postwar homes which will result from extensive studies made over the past year by scientists and heating engineers of Anthracite Industries, Inc., in its laboratories in Pennsylvania.

The design of the new furnaces will be radically different from conventional furnaces, as the combustion is based on a new principle. Laboratory models of the burning mechanism were demonstrated in Primos, Pa., before a group of scientists, heating engineers, heating equipment manufacturers and others.

The combustion chamber of this new device is a plain horizontal steel tube, 18 inches long, and either four or six inches in diameter, into which the anthracite is pushed at one end and burned in the center section. Ashes, which finally drop from the end of the tube, occupy the rest of the space. A mechanical worm, similar to the endless screw in the familiar household meat grinder, keeps the fresh coal, the burning fuel, and the ashes in a steady movement from one end of the tube to the other. This worm is in a delivery tube, a prolongation of the 18-inch tube where combustion takes place.

While the worm is in operation, pushing the anthracite into the combustion section, a constant stream of air is pulled by a suction pump placed over the worm section of the feeding tube, into the opposite open end of the combustion tube, through the ashes to the burning section. Any gases resulting from combustion are drawn by it onward through the unignited coal, which absorbs much of their heat, and pass through the pump to an escape flue.

A water jacket with a layer of water about an inch thick surrounds the 18-inch steel tube and absorbs the heat from the steel itself. This water is in continuous circulation within the water jacket and throughout the hot water radiators in the house. It is kept in circulation by a small electric pump in much the same way as the water in an automobile engine is circulated through the engine and radiator.

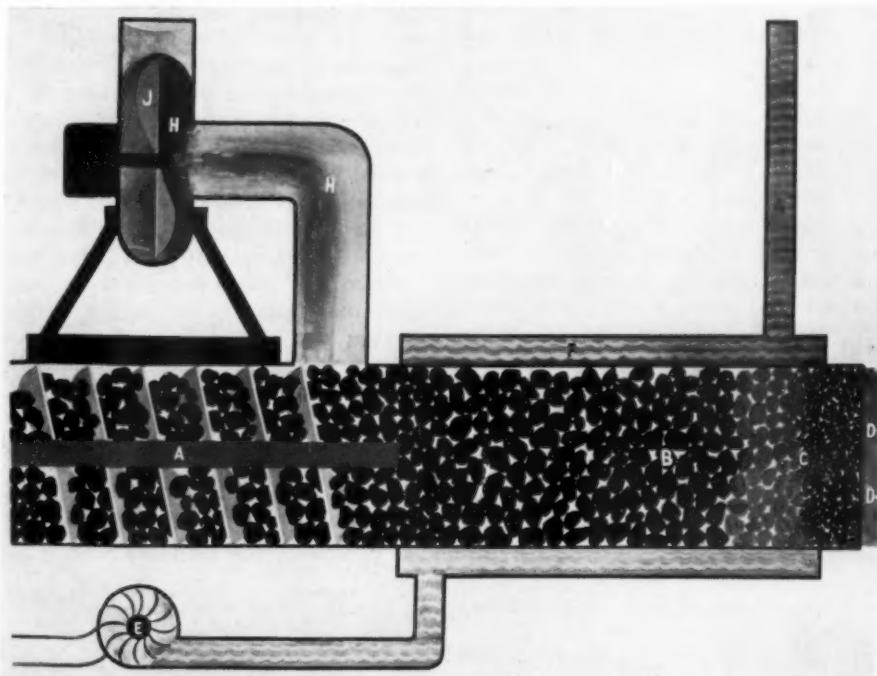
To ignite the coal, when the heating unit is put into operation, a small bag of shredded paper, shavings and charcoal is stuffed in the ash-end of the tube just ahead of the coal. When this is lighted with a match and the suction fan started, the coal is ignited almost immediately. It will continue to burn as long as fresh coal and air are supplied. The rapidity of combustion may be controlled with thermostats, which will regulate the speed of the suction pump and the screw feeder.

The economy of this new device is due to the complete combustion resulting when the coal and air supplies are properly regulated, and also to the high rate of heat absorption by the steel tube and the surrounding water in the water jacket. In addition the device prevents the loss of vast quantities of heat which often pass off in the gases that collect above

the firebed in the ordinary furnace and escape only partly burned.

Just how economical the new furnace and method of burning anthracite will prove cannot be determined until household units are designed and scientifically tested. In the new method the coal is consumed from five to six times as rapidly as in the conventional furnace but the amount of coal burned is much less, and tests show that it liberates much more heat. In contrast with present home heating equipment, which burns anthracite at the maximum rate of approximately 10 pounds per square foot per hour, the new development makes it possible to burn 50 to 60 pounds per square foot per hour. This liberates over 500,000 B.T.U. (the British Thermal Unit, commonly used in America) per cubic foot as compared with 50,000 liberated with present-day equipment. As a result, the heat absorption per square foot of heating surface is raised from 6,000 B.T.U. to 40,000 or 50,000, with a reduction in the total amount of coal consumed during the heating season.

The principle of the new burner, according to Dr. Raymond C. Johnson in charge of research for Anthracite Industries, "is founded upon a basic characteristic of anthracite combustion. Anthra-



TOMORROW'S FURNACE—A tube surrounded with a water jacket! A revolving worm (A) feeds the coal into one end; ashes are at the other end. Air enters at (D) and is drawn through by a fan (J) in the smoke pipe (H). The water (F) is forced through the jacket by a circulator (E) and carries the heat to the house through the outlet pipe (G).

cite, unlike most other fuels, under proper conditions can be made to burn to complete and perfect combustion within its own area without the necessity for secondary air or secondary combustion space."

Without the need for this secondary space the complete unit using the new method will probably not require over a two-by-three foot floor area and will not stand over two feet high.

The new furnace may be adapted to

hot-air and to steam-heating systems. With special adaptations the principle may be used in an upright gravity-fed cylinder with a hand ash-shaking device. No clinkers form in the new furnace because, despite the higher rate of burning, the small fire bed permits the water surrounding the tube to carry off the heat so rapidly that the actual temperature of the burning coal is lower than the point at which clinkers form in anthracite fire.

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ECONOMICS

Plenty of Gasoline

In the immediate postwar period, gasoline will be plentiful. Unsettled conditions may restrict vacation travel.

► PASSENGER car owners may have nearly 700 gallons of gas apiece to drive on in 1945, if the war in Europe should be over by that time, and if estimates made by C. L. Burrill, petroleum economist of the Standard Oil Company of New Jersey, as reported to *Petroleum Technology*, are correct

In any event, Mr. Burrill states, gasoline will be plentiful in the immediate postwar period as military consumption declines. Gasoline consumption will be heavy because cars will be older, and probably use more gasoline per mile of travel. Also contributing to the heavy consumption of gasoline will be the large amount of automotive travel by families returning to their homes from war production centers.

Vacation travel, Mr. Burrill points out, may be restricted during the time that war workers are shifting to civilian industry and soldiers are being demobilized. This, and the fact that many cars will be in poor repair, may tend to hold gasoline consumption down to a normal level, and prevent it from skyrocketing.

In addition to the crude oil produced in the United States, the total supply of petroleum products available to meet postwar requirements includes a substantial amount of natural gasoline as well as imports of fuel oil and heavy crude oil.

It is generally believed, Mr. Burrill states, that one important effect of the substantial construction of catalytic cracking plants during the war will be to increase the yields of light products at the expense of the yield of residual fuel oil, thereby making it possible to produce

the light product requirements with less crude oil than would be necessary with the older thermal cracking process.

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PHYSICS

Lightweight Telephone Switching Unit Developed

► A WORKABLE telephone switching unit weighing only a few ounces and so compact that the operator can carry the parts in his pocket or in a pouch of his cartridge belt, has been put into service by the Army. The unit is designed for use where it is not practical or possible to carry regulation switchboards, such as in the field while under fire.

Basis for the new communications system is a transparent plastic plug with fasteners for line connections, a neon lamp that responds to ringing signals, in place of a bell, and two combination jacks and plugs for tandem connections.

The operator can make not only individual connections but conference connections by calling the desired parties individually and connecting the adapter plugs in tandem. When a conversation has been concluded, the parties flash the operator, who then disconnects the plugs.

The new unit was developed by the Signal Corps in response to the need for substituting a visual signal for a bell signal. A bell can be heard for considerable distances by enemy snipers. The greater use of the new light unit for substitute emergency switchboards was a by-product.

In use, the operator attaches the field

wire pair entering his outpost to the new unit, and connects his telephone by a short length of wire to another unit plug. Incoming calls flash the lamp in the first unit plug, and this signals the operator, who then makes connection with his telephone set by putting the two plugs together.

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Pyrethrum grown in Peru and Ecuador is found to be of equal quality with the Japanese-grown insecticide plant.

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AERONAUTICS

Sky Road Signs

In the future, highways of the sky will be clearly marked with the names of towns lettered in characters from 10 to 20 feet high.

► **SKY HIGHWAYS** in the United States will be marked more clearly than many roads when flying Americans take their family cars of the air out for a Sunday joy ride. Every city, town, and village will be clearly marked so that its exact location is understandable to the pilot.

All of this is a part of a Civil Aeronautics Administration program begun in 1935 to develop a method of marking sky highways so plainly that the possibility of a pilot's becoming lost during contact flight is practically eliminated.

The officially adopted system will be put into effect by the CAA just as soon as the Army's ban on navigational aids to private flying is lifted. It involves the lettering of the name of the town on a roof or wall in characters from 10 to 20 feet high, and also the latitude and longitude of the place, separated by an arrow pointing to true north. In addition, special symbols will tell the pilot the direction and distance to the nearest airport, airpark, or landing area. These four items comprise a complete air guide for the pilot.

A typical air guide might read "DOYLE 39.3 (arrow pointing true north) 95.3." Translated, this means that you are flying over the town of Doyle, located at 39.3 north latitude and 95.3 west longitude. If there is an airport in the vicinity, the name of the airport and the distance to it will appear within the outline of a huge arrow. If an airpark is nearby, this same information will appear in a circle with a short arrow.

In addition to being painted on the roofs and sides of buildings, air guides may also be placed on highways, on mountainsides where the letters and arrows will be formed of crushed rock; on lawns, road intersections and cloverleaves with small shrubs forming the letters; and in desert areas, where letters will be made from enameled metal strips mounted on posts a few feet above the ground. Some markers may be illuminated at night to aid private flyers traveling after dark.

Chrome yellow and black, international orange and white, are the preferred colors for high visibility.

Air guides are already being established around some military training fields. In many states, state officials are urging every town to get on the air-guide map. It is expected that about 100,000 air markers will be required to cover the continental United States adequately.

A special manual has been prepared by the CAA Airways Engineering Division for assisting those interested in installing the guides. Copies will be made available to anyone planning to install air guides.

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CHEMISTRY

Fire-Retarding Paint Reduces Fire Hazards

► **THE NAVY'S** new fire-retarding paint reduces the fire hazard aboard ships by reducing the amount of heat radiated from metal surfaces painted with it. This tends to keep compartments of the ship adjacent to the one on fire from getting overheated to the ignition point.

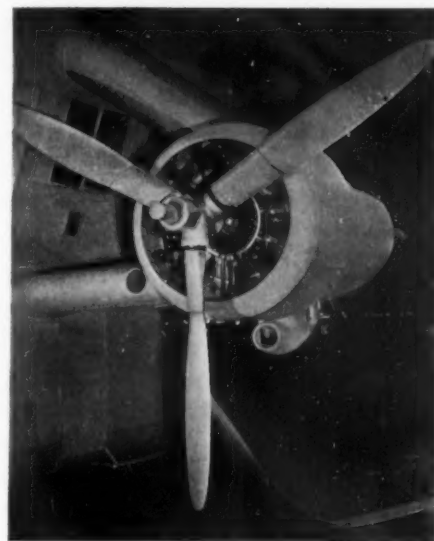
Millions of gallons of this new paint are being used each month on interiors and metal furniture. It was developed as a result of research by the Bureau of Ships under the direction of Rear Admiral Edward L. Cochrane, U. S. Navy.

A thick dried film of ordinary paint, containing linseed oil or some other burnable material, will burst into flame when overheated. By substituting active fire-retarding ingredients, such as antimony oxide, and reducing the amount of burnable material in the paint, it was possible to produce the new fire-retarding paint.

Paint aboard naval vessels is essential to reduce rusting, improve illumination and aid in maintaining sanitary conditions on shipboard. Fire-retardant paints popular on land, such as casein paints, are not suitable for use aboard ships, due to lack of resistance to washing and mildew.

Paints cannot be made fireproof in the sense that they will not be damaged if sufficient heat is applied for a long enough time.

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BRAKE—The Navy's newest and largest blimp has a three-bladed Curtiss electric propeller which can be pitched at "reverse thrust" for use as an airbrake or for pivoting.

AERONAUTICS

Propellers Used as Brakes On Navy's Largest Blimp

► **PROPELLERS** are used as brakes on the largest non-rigid airship yet constructed in the United States, the Navy's new M-1. The blimp will be used for antisubmarine patrol duty.

One of the new fully controllable-reversible electric aircraft propellers is attached to each side of the ship. By reversing the blade angles of the propellers, the new blimp can be brought to a virtual standstill in mid-air. It can turn as on a pivot by reversing only one propeller.

Engineers also reported that the controllable feature contributes to faster take-off when the blimp is heavily loaded. By setting the blades at the take-off angle to give them a bigger "bite" of air, and speeding the engines, the blimp, traveling on its landing wheel and using its underside as a wing, can make a running take-off. The reverse thrust propellers can also be used to control the landings more fully.

Built by Curtiss-Wright Corporation's propeller division, the new reversible blade propellers are the first of their type to be installed on lighter-than-air craft. The blimp itself was built by the Goodyear Aircraft Corporation, Akron, Ohio, and is powered by two 500 horsepower engines.

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PHYSICS

Temperature in Engines Measured by Magnet Ratio

► A UNIQUE moving-magnet ratio instrument, designed for the measurement of oil and coolant temperatures in aircraft, was described by F. R. Sias and D. B. Fisk, both of the General Electric Company, at a meeting of the American Institute of Electrical Engineers in St. Louis.

The instrument consists of two sets of coils set at right angles to each other and a rotor moved by the coils. The small outer set of coils carries a constant current. The larger inner set of coils, perpendicular to the axis of the outer coils, is connected with the temperature bulb that records the oil or coolant temperature in the engine; the current varies directly with the temperature. The rotor aligns itself according to the ratio of the current between the two sets of coils. A pointer attached to the rotor indicates the temperature on a dial attached to the instrument panel of the airplane.

The development of new magnetic materials, all characterized by high magnetic energy per unit weight and high coercive force, shown to an exceptional degree in sintered oxide, makes possible the construction of moving coil instruments for aircraft. The new instrument has the properties of light weight, ruggedness, simplicity, and serviceability required for aircraft use.

The instrument is readily adaptable to the measurement of ohms, current ratios, voltage ratios as well as telemetering and voltage-weighted current indications.

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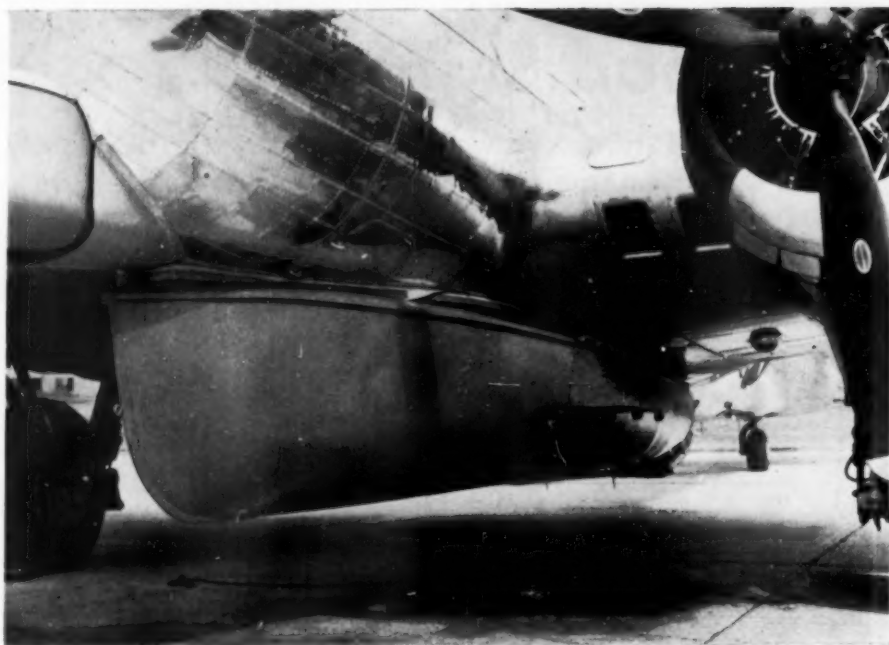
CHEMISTRY

Chemical Industry Medal Presented to Col. Dewey

► THE CHEMICAL Industry Medal, awarded annually by the American Section of the Society of Chemical Industry, is being presented this year to Col. Bradley Dewey for his work in colloid chemistry, especially pertaining to rubber latex, and his accomplishment in administering the synthetic rubber program during a critical war period.

Col. Dewey recently resigned as Rubber Director because he felt that the synthetic rubber construction program had been completed. In World War I, Col. Dewey was awarded the Distinguished Service Medal while in charge of the Gas Defense Division.

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AIRBORNE LIFEBOAT—Fastened under the wing of a Boeing B-17 with clearance a matter of inches, this boat can be dropped into the water from an altitude of 300 feet by means of a rayon parachute. Official U. S. Air Forces photograph.

MILITARY SCIENCE

Airborne Lifeboats

Survivors in the ocean can now be saved by all-plywood, power-driven lifeboats dropped from planes. Can use sails to save gasoline.

► LATEST DEVICE used for air-sea rescue work is an all-plywood, power-driven lifeboat dropped from planes to persons downed at sea. The boat carries enough food, clothing, and gasoline and sail to permit a voyage of 1,500 miles in rough weather on any ocean in the world. Twelve men off Cuba could, with reasonable luck, reach New York City in one of these boats.

The boat is dropped by 48-foot rayon parachutes from four types of planes, the B-17, B-29, C-46 and C-54, flying at an altitude of 800 feet into the wind at a speed of 120 miles an hour. It strikes the water at an impact speed of 25 feet per second, and at an angle of 45 degrees. Upon striking, a smoke-pot is set off to aid survivors in spotting the boat. Two rockets with 150-yard buoyant lines are also fired automatically from each side of the boat, by means of an electric salt-water immersion switch. Using these lines, the survivors are able to pull themselves to the boat, if the

sea is too rough for swimming to it.

To save gasoline, the 27-foot boat can be converted into a sailing sloop by use of a portable 20-foot mast and 145 square feet of mainsail and jib. Top speed of the boat, when operated by twin five-horsepower engines, is eight miles an hour. In addition to furnishing power, the engines are used to operate two saltwater stills, and their hot cylinder heads serve as stoves for heating canned food and coffee and for cooking fish and birds which survivors may catch.

The boat is divided into three sections: fore and aft chambers with an open cockpit in the middle. The chambers shelter the men from inclement weather and the blistering rays of the sun. To prevent the boat from capsizing in rough seas, cylinders filled with carbon dioxide are stowed fore and aft. The craft has weathered a 30-foot sea in tests.

Standard equipment includes blood

plasma and medical supplies, canned foods, fishing tackle, blankets, air mattresses, rain-repellent parkas and pants, underwear, fatigue hats, stockings, radio equipment, signalling and navigational devices, as well as cigarettes, and chewing gum.

The new rescue boat, popularly called "The Flying Dutchman," was developed by the Army Air Forces Materiel

Command last fall to provide navigable craft for floating survivors of ship sinkings or ditched planes, when rough seas prohibit seaplanes from landing, or when there are too many survivors to be picked up by aircraft; and for survivors stranded on isolated islands which are not accessible because of coral reefs and jungle.

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MEDICINE

Sulfa for Gas Gangrene

Sulfabenzamine has been found to be effective against germs prolific in the soil of France. May soon be prepared in tablet form.

► A NEW SULFA drug effective against the kind of germs that cause gas gangrene in wounds has been developed and given extensive study, Dr. Theodore G. Klumpp, president of the Winthrop Chemical Company of New York, announces.

The new drug is sulfabenzamine. Winthrop calls it Sulfamylon. It is superior, Dr. Klumpp says, to other sulfa drugs in infections with anaerobic bacteria. These germs grow without air,

include the group that causes gas gangrene, and are especially prolific in the soil of France.

Two German preparations containing Sulfamylon, captured by the British in North Africa, spurred the interest of the Winthrop scientists in developing a better sulfa drug for anaerobic infections. The captured drugs were called Marfanil and Marfanil Prontalbin. They were in powder form for dusting on wounds.

Preparation of Sulfamylon in tablet

form to be taken by mouth, which may be more effective than its use as a powder dusted on wounds, may be expected soon, Dr. Klumpp believes.

A test for determining the concentration of the new drug in the blood of patients, necessary for determining proper dosages, has been developed. In this connection Dr. Klumpp states that laboratory experiments are already under way under the direction of the National Research Council and that tests on patients will follow.

Besides its effectiveness against anaerobic bacteria, sulfabenzamine, or Sulfamylon, has two other advantages over other sulfa drugs: Its antibacterial activity is not affected by pus or other wound discharges and is not neutralized by para aminobenzoic acid.

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PHYSIOLOGY

Male Brain Becomes Female Through Chemical Change

► MALE brains can be changed to female and female brains to male ones by injections of appropriate sex hormones, Dr. Arthur Weil, of Northwestern University, reported at the meeting of the Association for the Study of Internal Secretions.

The brain sex reversal is a change in chemical constitution of the brain, specifically in its phospholipid content. Injection of a female sex hormone into a young male rat changes its brain chemical composition to the female type. Male sex hormone injection into the female accomplishes the reverse change.

Removal of the sex glands changes the chemical constitution of the male and female brain to a more neutral intermediate level, Dr. Weil reported.

Hormones from other glands also affect the chemical composition of the brain. When the adrenal glands, which produce the familiar adrenalin as well as another powerful hormone, are removed, both male and female brains increase considerably in size. The amount of different lipid fractions increases proportionately, but without qualitative changes.

Removal of the pituitary gland in the head affects the male brain slightly more than the female brain, and leads to a slight increase in the amount of phospholipids and their phosphorus content.

Previous study has shown that the phospholipid content of the brain is not changed qualitatively by either excess or deficiency of thyroid gland hormone.

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RESCUE—The lifeboat, shown in this official U. S. Air Forces photograph, was dropped from a plane. Although it is a powerboat, sail can be used to conserve gasoline.

ENGINEERING

Ultraviolet Light Makes Plane Instruments Glow

► THE USE of "black light" from fluorescent mercury-vapor lamps to make the luminous or fluorescent dials of aircraft instruments glow, with no apparent visible light in the cockpit, is reported by Maj. A. D. Dirksen, of Materiel Command, Wright Field (*Electrical Engineering*, July).

The radiation used for this purpose is in the near-ultraviolet region below the visible portion of the spectrum. A dense ultraviolet filter cuts out nearly all trace of visible light. This use of fluorescent lamps for lighting aircraft instruments was developed by the Engineering Division, Wright Field, in cooperation with lamp manufacturers. The lamps are mounted between the pilot and the instrument panel and directed so that none of the direct rays of light reach the pilot's eyes. He sees only the glowing instruments. The almost complete darkness of the cockpit improves the pilot's ability to see at night. Reflection of light on the windshield is practically eliminated.

For this new use of fluorescent lamps, the lamp industry developed a 24-volt direct-current blue fluorescent lamp for operation directly from the aircraft electric system, doing away with heavy vibrator equipment usually attached to fluorescent lamps. An iris-type shutter makes it possible to reduce the light from 100% to zero and by rotating the filter it is possible to select visible light or the "black" near-ultraviolet.

A portable fluorescent lamp, attached to a headband, has been developed for use of the bombardier when using the charts, bombing tables and bombsight.

The new fluorescent lamps provide uniform floodlighting that is not detectable by enemy aircraft with less weight and power consumption than for any lighting system used before by the Army Air Forces, Major Dirksen said.

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OCEANOGRAPHY

Plant Pigments Found In Ancient Sea Mud

► CAROTENE and related yellow plant pigments, of relatively complex structure, have been found in measurable quantities, undecayed, in sea-bottom muds of varying ages estimated from as little as 15 years to as much as 8,000 years, Prof. Denis L. Fox of the Scripps

Institution of Oceanography states (*Science*, Aug. 11). Prof. Fox terms them "biochemical fossils."

These yellow compounds have come into prominent notice in recent years because of their importance in the formation of vitamin A.

Possible sources for the pigments in the sea sediments include the larger seaweeds and microscopic one-celled aquatic plants.

Science News Letter, August 26, 1944

STATISTICS

Pre-Election Test of Voters' Intelligence

► AMERICAN voters have taken a pre-election test of their intelligence. Not all the 60,000,000 were examined, but a representative sample selected in the same way people are picked for Gallup polls.

They passed—with scores corresponding to a mental age of 16, which is just about what yours is if you are an average, normal American. About one-third (31% to 33%) would be in the upper half of a class of college freshmen in intelligence. Results of the test are reported by Dr. Robert L. Thorndike, Columbia University psychologist, and Dr. George H. Gallup, (*Journal of General Psychology*).

Women voters are just a trifle more intelligent than are men voters, and young voters in their twenties are somewhat more intelligent than their elders who are over 60. Those who voted for Willkie in 1940 average somewhat higher in intelligence than do those who cast their ballot for Roosevelt—a small difference attributed to the difference in socio-economic level. Those who failed to vote for either of these candidates scored lower than did their supporters.

The test given was a 20-word, steeply graded vocabulary test, and did not, the investigators point out, measure other phases of intelligence.

Results of this intelligence survey of the American voting public give a much brighter picture than the first assay of U.S. adults, the Army testing of white drafted men in 1917. The mental age of that group was determined to be only 13 years. That group, however, was not representative of either the total adult population or of voters. At the lower end, many defectives and illiterates were probably excluded but it is believed that the upper end was also thinned out by the exemption of married men, volunteers, and those in essential war jobs.

Science News Letter, August 26, 1944

IN SCIENCE

ENGINEERING

Turbine-Driven Cargo Ship Needs Huge Reduction Gear

See Front Cover

► REDUCTION from the whirlwind speed of a ship's turbine to that of its slow propeller requires gears like that shown on the front cover of this *SCIENCE NEWS LETTER*. This giant, called by workers the "mainspring," is 14½ feet in diameter and contains more than 400 parts machined to tolerances of thousandths of an inch.

The 58-ton gear, used on C-3 cargo ships, requires an entire flatcar for shipment. The photograph shows it being prepared for assembly at the Warren City Manufacturing Co., in Warren, Ohio.

Science News Letter, August 26, 1944

ENGINEERING

New Evaporator Distills Heat-Sensitive Materials

► A NEW TYPE of evaporator that uses infra-red radiation as a heat source was described by J. Arthur Reavell, at a meeting of the Institution of Chemical Engineers in London. It is claimed that the infra-red evaporator is a quicker and cheaper method of evaporating and distilling such heat-sensitive materials as blood serums and penicillin.

The material, usually a liquid, to be treated is put into an evaporating or distilling tube made of silica or special glass through which infra-red rays can pass. Infra-red heat lamps, such as are used by athletes for baking out muscular knots, are placed outside the tube.

The liquid inside the tube absorbs the infra-red rays. These are turned into heat within the liquid, the tube itself remaining comparatively cool. This system does away with the ill effects caused by the hot tube wall coming in contact with the liquid, as in heating over a flame.

Another important advantage of this new method of evaporation and distillation is that the necessity of using a high vacuum when working with materials which are very sensitive to heat is eliminated.

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THE FIELDS

BOTANY

Mold That Lives in Soil Bites Insect for Food

► WHEN AN INSECT bites a plant, that isn't news—as any weary, bug-be-deviled Victory Gardener can tell you. But when a plant bites an insect, that's at least interesting.

That is just what one plant, a lowly mold that lives in the soil, does to insects, Dr. Charles Drechsler of the U.S. Department of Agriculture has discovered. The fine threads of the mold, criss-crossed into a fused network, send up little finger-like columns that ooze sticky liquid at their tops. Small wingless insects, of the primitive order known as springtails, get caught on this natural tanglefoot. The mold then sprouts new filaments that grow into the victim's body, sucking it empty of anything that may be nourishing to the hungry plant.

Dr. Drechsler suspects that there may be other insect-eating molds. A number of mold species are already known that prey on small worms in the soil.

The newly discovered carnivorous mold species has been given the botanical name *Arthrobotrys entomophaga*. Expanded into English, that means "jointed cluster that eats insects."

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PHYSICS

Smoke-detecting Apparatus For Fire-warning at Sea

► PHOTOELECTRIC smoke-detecting apparatus now provides for ships at sea the same fire-warning system that is installed in many modern buildings.

The new apparatus, (*Electronics*, July), draws samples of the air from over 30 different parts of the ship, through individual pipe lines to the fire-detecting cabinet, which is usually located in the wheelhouse.

When the air enters the detecting cabinet it is first run into a long tube for photoelectric observation. Only one sample of air from one of the individual pipe lines is examined at a time. If no smoke is present, the air is released into the wheelhouse.

Smoke on the other hand, causes an alarm to sound and indicates automatically the source.

As a further check, the smoke sample is released into the wheelhouse, so that if the electronic device should fail, for some reason, to detect the smoke, it can be detected by smell.

Controls on the new fire-detecting system, developed by Walter Kidde and Company, can be adjusted to compensate for dust on the lens, mirror or glass surface of the photoelectric cell. This dust, if not compensated for, might affect the system in the same way that smoke does and thus might cause a false alarm.

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ORNITHOLOGY

Carrier Pigeons Do Not Require Special Diet

► CARRIER PIGEONS, much used in both Army and Navy, don't have to be pampered with special diet; they'll do their hazardous work just as well on the avian equivalent of regulation GI rations, it has been demonstrated in tests at the New Jersey Agricultural Experiment Station.

Among pigeon breeders there has long been a belief that to get the birds to come home promptly they must be expecting a meal containing things especially tasty to pigeons—expensive ingredients, that sometimes have to be imported.

To test this notion, the experimenters here fed two similar groups of birds on contrasting diets. One got the feed that the fanciers recommended, the other an ordinary squab-raising ration. Results showed no material difference in speed, number of birds returning on the same day, number late and number lost.

Science News Letter, August 26, 1944

INVENTION

Pontoon Stretcher Perfected For Use in Deep Water

► WHAT might be termed a pontoon stretcher, to enable medical corpsmen to get seriously wounded men over water too deep to negotiate with ordinary hand-borne stretchers, is the invention offered by A. N. Spanel of Princeton, N. J., for patent 2,355,757. The stretcher itself is of conventional pattern, but attachable under each end is a collapsible, cylindrical float of airtight fabric construction. When not in use, the collapsed floats can be carried in pouches slung over the corpsmen's shoulders.

Science News Letter, August 26, 1944

HORTICULTURE

Special Peaches Bred For Persons with Ulcers

► SUFFERERS from gastric ulcers and other stomach troubles who have been forbidden acid fruits by their physicians can at least enjoy peaches, thanks to a 15-year breeding program at the New Jersey Agricultural Experiment Station in New Brunswick, now just reaching a successful conclusion.

Working in cooperation with a Trenton physician, the plant breeders discovered that ulcer patients could eat raw peaches without ill after-effects if their acid content was low enough. So they started a project for the production of special low-acid peach varieties that combined other desirable qualities of flavor, size, productivity and hardiness. Now there are no less than 23 good peach strains, ripening in different seasons, that are considered suitable for this purpose.

The peach breeders have also been hard at work on "regular" peach varieties. A total of 53 new kinds, both yellow- and white-fleshed, ripening at evenly spaced intervals from mid-July to the end of September, are announced as practically ready for general introduction.

Science News Letter, August 26, 1944

ORDNANCE

Mortar "Powder" Comes in Celluloid-Like Sheets

► POWDER for the Army's mortars isn't really a powder at all. It comes in thin, flat sheets that look a good deal like opaque celluloid, that are stitched together on ordinary sewing-machines in one stage of their manufacture at the Radford Ordnance Works, Radford, Va.

The sheet "powder" that serves as a propellant for mortar shells has nitrocellulose as its base. It is "souped up" with nitroglycerin, and several modifying agents are added.

In its semi-finished form, the propellant looks like blotting paper. Rolled thinner, it takes on the sheet-celluloid appearance. These are stitched together and then cut into accurately measured squares, each with a hole through its middle.

For each caliber and weight of mortar shell, a particular thickness of sheet is required, and each square must meet a weight requirement with very narrow tolerance limits. This is to insure uniform burning rates, which in turn make for accurate adjustment of fire.

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ASTRONOMY

Autumnal Equinox

On September 22 or 23, the sun will reach the halfway mark in its southward journey through the sky, and fall will officially begin.

By JAMES STOKLEY

► AN astronomical event of September, though perhaps not a welcome one, is that which occurs this year on Sept. 23 (or late in the evening of Sept. 22 in the Central Time Zone and farther west). On this date, at 12:02 a. m., Eastern War Time, the sun reaches the halfway mark in its southward journey through the sky. This is the autumnal equinox which, in the northern hemisphere, is conventionally considered as the beginning of autumn. At that time the sun is directly over the equator. Throughout the world it then rises directly east, sets directly west. The sun shines, for half of the 24 hours, on every part of the world. The only other time when this is true is at the vernal equinox, March 20 this year, when spring begins.

Nothing occurs in the sky to mark the equinox, though it does happen this year, purely by a coincidence, that on the date in question two planets will come very close together in the eastern sky before sunrise. All the planets have now gone from the evening sky, and so none are shown on the accompanying maps, as these depict the heavens at 11:00 p. m., Sept. 1, and 10:00 p. m., Sept. 15. Saturn, however, rises in the northeast a little before midnight, and in the early morning hours is visible in the east in the constellation of Gemini, the twins. It is a little to the right of the stars Castor and Pollux, and exceeds them both in brightness.

Planets Meet

Toward the end of the month Jupiter, several times as bright as Saturn, rises about an hour and a half before the sun, so it will only be visible in the morning twilight. On Sept. 22 Mercury reaches its position farthest west of the sun, and also rises about an hour and a half before sunrise. On the 23rd, the two planets are very close together, at a distance considerably less than the diameter of the moon. Jupiter will be the easier to see, because of its superior brightness, and if you find it, you can

probably locate Mercury nearby. This, however, is not a very favorable appearance of Mercury, for it can draw considerably farther away from the sun than it does at this time, and this would make it rise much higher in the sky before sunrise.

Vega Is Brilliant

As for the stars of the evening sky, Vega, high in the west in Lyra, the lyre, is the most brilliant now visible in the evening. Directly overhead is Cygnus, the swan, otherwise called the northern cross, with first magnitude Deneb. South of Cygnus is Aquila, the eagle, with Altair as the brightest star of the constellation.

There are three other first magnitude stars indicated on the maps, all of them close to the horizon. In the northwest we see Arcturus, in Bootes, a star which will soon disappear from the evening sky for a few months. But taking its place we see toward the northeast Capella, in Auriga, the charioteer, which will shine still more prominently through the autumn and winter evenings. And low in the south is Formalhaut, in Piscis Austrinus, the southern fish, a star which is so far south that only for a few months is it visible to us at all.

Though small, the constellation of Lyra is an interesting one. For one thing it marks approximately the direction in which we're going. The entire solar

system is traveling toward this part of the sky at a speed of 12.2 miles per second. This means, of course, that the earth is going that way, too, since at the same time we are revolving around the sun, our actual path in space is not a circle, as often supposed, but a helix, like that of a man ascending a so-called "spiral" stairway.

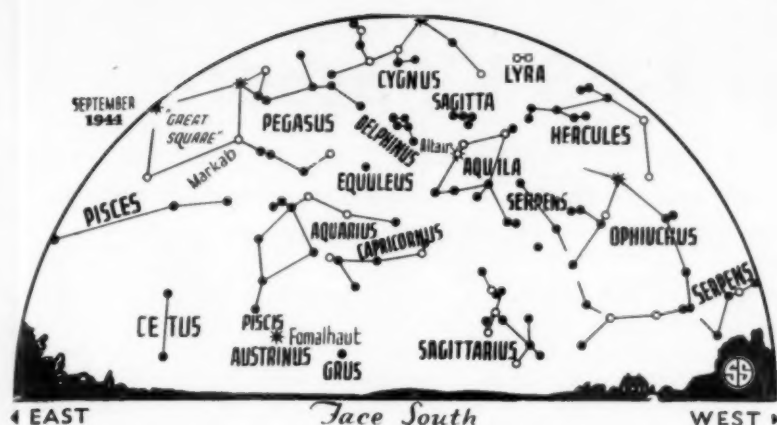
Then again, Vega, and not our present Polaris, will mark the north pole of the heavens about the year 14,000, thus resuming a post of honor which it held around 12,000 B. C. This is an effect of another movement of the earth, a "wobbling" motion called "precession" by which a number of stars serve successively as the pole star. For example, about the time the pyramids were built in Egypt, some 4,000 years ago, Thuban, in Draco, the dragon, was the pole star. The head of Draco is right below Vega, and Thuban is the third star from the end of the tail which extends down toward Ursa Major, the great bear.

Star Triangle

Several interesting objects are revealed in Lyra by the telescope. For example, if you look closely at the constellation, you will find that there are two faint stars near Vega, forming with it an equilateral triangle. The northernmost star of the triangle is epsilon Lyrae, known as the "double-double." To a keen eye, or with a pair of binoculars, this star appears as two, while a small telescope shows that each of these stars in turn is also double.

And also in the same constellation, visible only with a telescope, is the ring nebula, called M. 57 after its number in Messier's catalog. It looks like a





◊ * ○ • SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS

smoke ring, but it is actually a globe of gas, which is made to glow by a star at the center. It is the most familiar example of the rather rare group of planetary nebulae.

Their name comes not from the fact that they have anything to do with planets, but merely because they look something like planets with a small telescope. Some, if not all, may be the remains of "new" stars—stars which in past ages have suddenly flashed out for a brief period with many times their normal brilliance. If this is the case, most of our present planetaries will have disappeared

after many thousands of years, but others will by then have taken their places.

Celestial Timetable for September

Sept.	EW	WT
2	4:21 p.m.	Full moon.
3	2:00 a.m.	Moon nearest, distance 220,000 miles.
9	8:03 a.m.	Moon in last quarter.
11	2:23 a.m.	Moon passes Saturn.
17	7:00 a.m.	Moon farthest, distance 252,700 miles.
	8:37 a.m.	New moon.
19	6:54 a.m.	Moon passes Venus.
22	7:00 p.m.	Mercury farthest west of sun.
23	12:02 a.m.	Autumn commences in northern hemisphere.
	1:00 p.m.	Mercury passes Jupiter.
25	8:07 a.m.	Moon in first quarter.

Subtract one hour for CWT, two hours for MWT, and three for PWT.

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GENERAL SCIENCE

Guggenheim Fellowships

► SIX SCIENTISTS are included among a group of 14 Latin-American scholars to whom Guggenheim Fellowship grants have been made. They will conduct research at various laboratories in the United States. Of the six, four are from Mexico and two from Argentina.

Three of the six Fellows in science are biologists. They are: Dr. Eduardo Caballero y Caballero of the National University of Mexico, who will conduct research in helminthology. Prof. Manuel Maldonado Koerdell of the University of Nuevo Leon, Mexico; he will work at the University of Kansas, in the field of comparative anatomy. Dr. Elisa Hirschhorn of La Plata, Argentina, whose researches on plant disease fungi will be carried on at the University of Minnesota and Harvard University. Dr. Rafael Aureliano Labriola, chemist at the University of Buenos Aires, will carry on studies of quantitative micro-analysis and of the techniques of hydrogenation at normal and high temperatures at the

University of Minnesota and the University of Wisconsin.

Prof. Alberto Barajas Celis of the National University of Mexico will conduct mathematical research on the theory of gravitation at Harvard University.

Guido Munch Paniagua, calculator in the National Observatory of Mexico at Tacubaya, D. F., will pursue studies in the field of theoretical astrophysics at the Yerkes Observatory of the University of Chicago, at Williams Bay, Wis.

Guggenheim Fellowships usually carry a stipend of \$2,000 for a year's study, plus additional sums to defray travel expenses. The Latin-American Fellowships were established in 1929.

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A postwar *under-water* tunnel to connect Copenhagen, Denmark, with Malmö, Sweden, is proposed; it would be 7½ miles long and have space for a two-lane highway and a one-way electric railway.

PUBLIC HEALTH

Polio Cases This Year Are Highest Since 1927

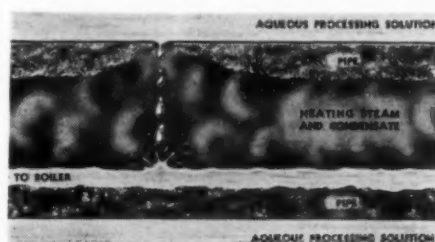
► INFANTILE paralysis cases throughout the nation continued to increase during the week ending Aug. 12. Latest reports to the U. S. Public Health Service show a total for that week of 1,015, compared to 932 for the preceding week and 545 for the corresponding week in 1943, which was a big polio year.

The total number of cases so far this year, 5,009, is higher than for any year since 1927, Public Health Service records show.

Increases were reported in North Carolina, New Jersey, New York, Ohio, Illinois, Michigan and Minnesota. New York reported the largest number, 356, including 108 from New York City. Cases decreased in Kentucky, Virginia, Pennsylvania and Maryland.

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Game species of *migratory water-fowl* in North America have increased nearly 400% in the past nine years.



WANT TO STOP THAT LEAK?

Where steam is used for heating and the resulting condensate is returned to the boiler, there is, of course, danger that leaks in the heating coils will contaminate the water by admitting some substance dangerous to the boiler.

To guard against this, we recommend measurements of the extent to which the water will conduct a small electric current. This "conductivity" varies with any form of impurity, and the L&N equipment necessary can be either of two models:

If the operation of a signal light and/or a dump valve is all that is required, we recommend No. 4850 Signalling Conductivity Controller.

For a continuous, automatic record of condensate purity, in addition to a signal and/or operation of a dump valve, we recommend No. 33111 Micro-max Signalling Recorder.

For further information, see Catalog N-95-163(1) on the Signalling Controller, or Catalog N-95-163 on the Micro-max Controlling Recorder.

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Jrl Ad N-95-163 (8b)

Do You Know?

Artificial eyes are now being made of acrylic plastics.

Turkey now has its first window-glass manufacturing plant.

American railroads use more bituminous coal per year than the total amount sold by all retail dealers.

Over 300 species of eucalyptus trees are known, and each produces its own distinctive oil.

Fellowships in health education will be provided by the National Foundation for Infantile Paralysis to train men and women as professional polio fighters.

The frigate bird, also known as the man-of-war, lives principally on fish but they seldom catch their own; they take them forcibly from other fisher-birds.

The alcohol industry, in its efforts to meet war needs, has increased its annual output from 100,000,000 gallons to 610,000,000 gallons.

The American cultivated blueberry, now an important commercial crop, is a result of developments of the past 35 years in the selective breeding of this native fruit.

About 26% of the 460,000,000 acres of commercial forest land in the United States is in federal or state forests, 30% is owned by farmers and the rest by lumbering and other industries.

Asphalt, the common paving material, is used also as a package waterproofing and sealing material, particularly for war supplies sent to humid climates; some say Moses' basket in the bulrushes was waterproofed with it.

A national milkweed-floss collecting campaign is being organized among school children and others; the floss is used in naval and aircraft life preservers to replace the unavailable East Indian kapok.

Langbeinite, a rare mineral found only in five countries, is valuable for fertilizer because the purified ore is a sulfate of potash-magnesia containing 22% potassium oxide and over 18% magnesia.

AERONAUTICS

New P-63 Kingcobra

This fighting plane has 50% greater combat radius and higher speed than the Airacobra. Big advantage is that it can penetrate deeper into enemy territory.

► **FACTS ABOUT** the Army Air Forces new P-63, an all-metal, low-wing, land monoplane, heavier, more powerful and more completely streamlined than the P-39 Airacobra which it is to replace, have been announced by the War Department.

The official combat radius of the P-63 is 50% greater than that of the P-39. This means that it can engage in aerial combat much deeper in enemy territory.

The new P-63, popularly called the Kingcobra, was developed, beginning in 1942, through the cooperation of the AAF Materiel Command at Wright Field and the manufacturers, the Bell Aircraft Corporation.

It has a service ceiling of nearly 35,000 feet; a new two-stage Allison V-12 engine of 1,500 horsepower thrusts it through the air at speeds close to 400 miles an hour. The plane upon which this ship was based, the P-39, has a 30,000 foot ceiling and a 375-mile-an-hour speed.

The principal changes in the new plane are in the power plant, and the low-drag laminar flow wing. The two-stage engine gives higher compression through the use of a fuel supercharger geared at one speed for medium altitudes and at a higher speed for high altitude flying. It has a rating of 300 more horsepower than the Allison engine in the P-39. The laminar flow wing section is designed to produce minimum drag on all surfaces of the wing and thereby increases the speed of the plane.

Incorporated in the new plane's design are the P-39's cabin with automobile type door, big air-intake scoop beside the pilot's seat and exhaust outlets on the side of the fuselage. The P-63 has a radius of turn shorter than that of any existing U. S. fighter. Its engineers claim it can turn with the Jap Zeros.

The armament of the P-63 is about the same as the P-39. Both are equipped with a distinctive 37 millimeter aerial cannon firing through the propeller hub and four .50 caliber machine guns, two on the wings and two in the nose firing through the propeller arc.

The AAF also revealed recently that

the jet-propulsion plane, produced by Bell Aircraft Corporation and powered by General Electric engines, has been designated as the P-59-A. The jet plane has been named the Airacomet.

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ORDNANCE

Two Novel Gun Mounts For Aircraft Patented

► **TWO NOVEL** gun mounts for warplanes have recently been patented. One, covered by patent 2,348,209 is the invention of Lt. Col. Rudolph Fink of the Army Air Forces; patent rights are assigned royalty-free to the government.

Instead of securing greater fore-and-aft command through mounting the gun in a protruding blister, Colonel Fink sets it in a hinged, sliding panel; this is flush with the side, and is connected with similar panels on either end, to maintain a wind-tight seal against the outer air.

To Henry K. Growald of San Diego was granted patent 2,348,470, on a detachable ball-and-socket mount, suitable for use on tanks, motor torpedo boats, etc., as well as on airplanes. By training the gun through a tight ball-and-socket arrangement, the length of barrel protruding outside the fuselage can be greatly reduced, with corresponding reduction in air drag.

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AERONAUTICS

Planes Lifted at Take-off By Vertical Blasts of Air

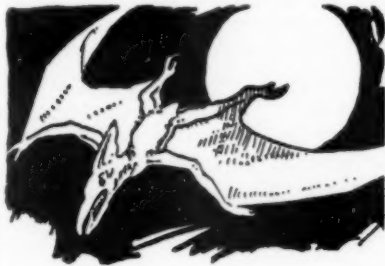
► **SOMETHING** novel in the way of helping big, heavily loaded airplanes to take off is proposed by two British inventors, T. L. Bonstow and A. E. Margolis, both of London, in patent 2,355,948. They propose to lay conduits under the runways of flying fields, to deliver strong vertical blasts of air as the planes pass over them, thus literally boosting them off the ground.

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PALEONTOLOGY

NATURE RAMBLINGS

by Frank Thone



Flying Fish-Traps

► PTEROSAURS, the weird flying reptiles that dominated the air in those far-gone ages when dinosaurs were rulers of the land and lakes and swamps, seem to have been exclusively fish-eaters. The story is told in compact summary by Dr. E. W. Gudger of the American Museum of Natural History (*Scientific Monthly*, August).

The success of these ancient flying reptiles as fish-catchers is all the more astonishing when one realizes the handicap under which they worked. There were no flying reptiles that could also swim, as fish-eating ducks, cormorants and pelicans can swim. It is highly improbable that any of them could dive and swiftly emerge, prey in beak or claws, like modern kingfishers or ospreys. They apparently flew or swooped along the surface, snapping up fish they found feeding or gulping air.

Even flying was probably a harder job for these flying reptiles than it is for birds or bats. Their wings and the muscles that moved them were much less efficiently built than those of modern winged animals, Dr. Gudger points out; pterosaurs probably soared like albatrosses or buzzards, but depended little, if at all, on flapping their wings like geese or crows. It is even possible that the only way they could gain altitude, if rising air currents failed them, was by climbing trees or cliffs.

But whatever their other limitations, the pterosaurs were certainly magnificently organized for soaring flight. Their wings, long, narrow and tapered, were like thin leathern sails stretched between their bodies and a single, tremendously elongated finger-

bone on either forelimb. Their bones were hollow for lightness, like those of modern birds. Dr. Gudger estimates that the biggest of them all, Pteranodon, which had an over-all length of eight feet and a wingspan of 20 feet, weighed only about 25 pounds.

This same Pteranodon was distinguished in another way. The other, smaller pterosaurs, like Rhamphorhynchus and Pterodactylus, had toothed jaws which presumably made fish-catching easier, huge Pteranodon had toothless jaws that were merely horn-rimmed, like

the beaks of modern birds. Yet he must have been a most successful fisher. There are indications that he anticipated modern pelicans in the invention of a storage pouch under his lower jaw, for specimens have been found with fish bones in that position.

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The electric system of an American modern peacetime cargo vessel must meet the requirements of the government; generators, motors, switchboards and wiring are included.



Six firms have been given a free license under Bausch & Lomb patents to manufacture binoculars for our armed forces and our allies. This includes the use of drawings and full access to production methods, including training in our factories.

Experience Shared . . . Production Multiplied

When war came to this nation, even the greatly expanded facilities of Bausch & Lomb could not meet the urgent demands for binoculars as well as the range finders and other military instruments which only this company was equipped to produce. There was a tremendously increased need, too, for optical instruments of the utmost precision for industrial research and control . . . that our fighting men might have fighting tools second to none.

Faced with this situation, Bausch & Lomb at once increased its own binocular production more than twelve hundred per cent and multiplied its effectiveness by making its specifications and production experience available to six other manufacturers.

In addition, the Bausch & Lomb glass

plant makes and supplies the fine optical glass which goes into lenses and prisms not only of the binoculars this company manufactures, but into others as well.

Thus, through the expansion of its glass plant and the sharing of its knowledge and experience in binocular manufacture, Bausch & Lomb is making possible an uninterrupted supply of these optical instruments for America's Armed Forces.

BAUSCH & LOMB

OPTICAL CO., ROCHESTER, N. Y.



Makers of Optical Glass and a Complete Line of Optical Instruments for Military Use, Education, Research, Industry and Eyesight Correction and Conservation

NUTRITION

Snacks Speed Work

Eating between meals has speeded up production in war factories. Authorities feel habit of three meals a day will persist after the war, however.

► THE WAR has made between-meal snacks G.I. in many factories, and many war plants are serving food at odd hours from mobile kitchens. This raises the question whether we, as a nation, will have our eating habits changed and become habituated to four or five light meals instead of three squares daily.

Housewives growing faint or frantic at the prospect of having to cook or wash dishes postwar more than three times daily may take heart. The housewife of the future may get away from dishwashing by using paper cups and dishes, now employed so widely by war industries and armed forces that they are unavailable to civilians.

But even so, it seems improbable that our eating habits will be revolutionized. Six nutrition authorities polled by *Science Service* telegraphically on this question feel that the general population will stick to meals three times a day, although there seem to be advantages in some cases for more frequent eating.

Between-meals snacks in factories are probably here to stay, because they have been shown to increase production. This discovery, incidentally, was made by the British during the last war and a number of reports have been published on the subject. One nutrition authority points out, however, that when we return to shorter working hours after the war, there may be neither time nor need for between-meals snacks in industries.

Whether the increased production is

due to the food or to the enforced rest and diversion from monotonous or tedious work that benefits the workers and steps up production is not clear. In the cases of workers who do not eat enough at their regular meals, skip breakfast, or, more rarely, burn up their food at faster than normal rates, the extra feedings are undoubtedly helpful because of the calories they supply.

Dr. Henry Borsook, professor of biochemistry at the California Institute of Technology, states succinctly what seems to be the opinion of most of the authorities consulted, as follows:

"Between-meals snacks are not revolutionizing American eating habits. At best they are only a useful supplement. A change from three square meals to light meals plus a snack would be a bad change even if it were possible which it is not.

"Too many people do not eat enough calories now. Between-meals eating at specified periods for workers is advisable: (A) As means of improving the quality of the diet; (B) To supply calories; (C) As a contribution to the establishment of rest periods in industry. These recommendations are only for industrial workers."

One of the authorities, however, differs somewhat from this view. He is Dr. Robert S. Goodhart, expert on nutrition in industry of the War Food Administration. "It is much better to eat several small meals than to put all your food down into three meals a day," he said.

Although Dr. Goodhart thinks the change to four or five meals a day would be good, he doubts whether it will come. The real revolution in eating habits, he points out, came long ago, with the beginning of the industrial age and the growth of cities, when people changed from eating whenever they could to three meals a day as a matter of convenience. In nations which are largely agricultural, the inhabitants still eat four or five times a day.

A look at the crowds before soda fountains and snack bars at almost any hour of the day, especially at mid-morning and mid-afternoon, leads one authority to suggest that a good many Americans,

whether they work in war plants or not, have the habit of between-meals snacks, unless they are just catching up with the breakfast or lunch they skipped.

Science News Letter, August 26, 1944

MATHEMATICS

Prime-Pairs Problem Of Euclid Is Solved

► EUCLID, the great ancient Greek mathematician who lived 2,200 years ago, presented a classical problem that he was unable to solve and which remained unsolved until the present time. A solution was presented at the meeting of the American Mathematical Society in Wellesley, Mass., by Dr. Charles N. Moore, professor of mathematics, University of Cincinnati. The total number of unsolved theoretical mathematical problems is now decreased by one.

Euclid, Dr. Moore stated, proved that there exists an infinite number of primes, that is, numbers such as two, three, five and seven having no divisors but themselves and unity. Succeeding generations of mathematicians have guessed, but have never been able to prove, that there likewise exist an infinite number of prime-pairs, that is, successive primes which differ by two, such as 11, 13; 17, 19; 41, 43; and so on.

At the meeting, Dr. Moore presented an involved but convincing paper giving his proof of the infinitude of prime-pairs.

Science News Letter, August 26, 1944

PLANT PHYSIOLOGY

Chemical Makes Lettuce Sprout in Hot Weather

► LETTUCE SEED, notorious for its reluctance to sprout after warm weather sets in, has shown an average germination of 87% at midsummer temperatures above 90 degrees Fahrenheit after being soaked in a solution of the chemical compound known as thiourea, Dr. Ross C. Thompson of the U. S. Department of Agriculture states (*Science*, Aug. 11). Control plantings from the same lots of seed, left untreated but otherwise handled in the same manner, did not even show 1% germination.

"There is reason to believe," Dr. Thompson comments, "that the thiourea treatment may have a practical application for assuring satisfactory germination where it is necessary to plant when the soil temperature is too high for germination of most commercial lettuce seed."

Science News Letter, August 26, 1944

NEW "PICK-UP" CANE

Permits Cripples and Invalids To Pick Up Small Articles Without Painful Stooping.

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Now... in the MASON "PICK-UP" CANE we offer a double purpose, light weight cane specially designed for cripples and invalids. Concealed mechanism permits easy picking up of papers, pencils, cards, coins, etc., with simple finger pressure. No painful stooping necessary. Exceptional balance with rubber-tipped base insures safer walking. Beautifully finished. 5-DAYS TRIAL—Write for FREE Circular and 5-days' trial offer. Use the Mason "Pick-Up" Cane yourself or as a perfect gift for a friend.



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• Books Off the Press •

ARTIFICIAL PNEUMOTHORAX IN PULMONARY TUBERCULOSIS, Including Its Relationship to the Broader Aspects of Collapse Therapy—T. N. Rafferty—*Grune*, 192 p., illus., \$4. Introduction by Henry Stuart Willis.

CLINICAL UROLOGY—Oswald S. Lowsley and Thomas J. Kirwin—*Williams & Wilkins*, 1769 p., 2 vol., illus., \$10.

FUNDAMENTALS OF INTERNAL MEDICINE—Wallace M. Yater—*Appleton*, 1206 p., illus., \$10. Second ed.

MODERN OPERATIONAL MATHEMATICS IN ENGINEERING—Ruel V. Churchill—*McGraw*, 306 p., illus., \$3.50.

PRODUCTION, JOBS AND TAXES: Postwar Revision of the Federal Tax System to Help Achieve Higher Production and More Jobs—Harold M. Groves—*McGraw*, 116 p., \$1.25.

QUANTITATIVE CHEMICAL METHODS FOR ENGINEERING STUDENTS—Otto M. Smith and L. F. Sheerar—*McGraw*, 118 p., illus., \$2.50.

SCIENCE IN THE UNIVERSITY—Members of the Faculties of the University of California—*Univ. of Calif. Press*, 332 p., illus., \$3.75.

THE SCIENCE OF DENTAL MATERIALS—Eugene W. Skinner—*Saunders*, 421 p., illus., \$4.75. Second ed., rev.

SMALL COMMUNITY HOSPITALS—Henry J. Southmayd and Geddes Smith—*Commonwealth Fund*, 182 p., \$2.

THE TWENTY-SIXTH SESSION OF THE INTERNATIONAL LABOUR CONFERENCE—Reprinted from the *International Labour Review*, Vol. 1, No. 1, July 1944, 37 p., 10c.

Science News Letter, August 26, 1944

CHEMISTRY

Glucosides Successfully Studied for First Time

► THE MOLECULAR structure of certain sugar compounds known as glucosides has been successfully determined recently by measuring the amount and the direction of twist given to a beam of polarized light passed through solutions of these substances. The method was developed by scientists at the National Bureau of Standards in Washington. The effect of temperature on the amount of rotation or twist was noted in the process. Polarized light is light that vibrates in one plane. When it is passed through certain substances the plane of vibration is turned at an angle. It has long been used in testing sugar, but this is probably the first time it has been successfully used in studying the

details of the structure of a glucoside molecule and the interactions that take place between certain groups of atoms within these complicated sugar derivatives.

The study at the government bureau has resulted in the preparation of several new compounds and the determination of their properties. The influence of temperature, and of the wavelength of the light used, on the optical rotation has been measured particularly for the benefit of other research workers.

Science News Letter, August 26, 1944

ORDNANCE

New Hammer for Firearms Is Patented by Garand

► JOHN C. GARAND, the government's most noted gunsmith, has taken out another patent, this time on a hammer for firearms. The hammer is thrust forward by a plunger impelled by a strong coil spring; just short of its contact with the firing-pin, a smaller auxiliary plunger imparts a slight bias to the blow, preventing the cartridge primer from blowing the pin backwards, with resulting wear and tear on the lock.

Science News Letter, August 26, 1944

In the Management of Severe Third-Degree Burns

much has been learned through the unfortunate occurrence of the Coconut Grove fire at Boston. The numerous reports in the medical press emphasize the need for large amounts of dietary protein of adequate biologic value, given as early as possible.* Meat is one of man's main sources of protein that can be eaten with relish several times daily in goodly quantities; its proteins are of highest quality, and it contributes to the satisfaction of the greatly increased vitamin requirements as well.

*"All the patients with ten per cent of surface area, or more, involved in third-degree burns became serious nutritional problems. . . . All patients were started on high protein, high vitamin diets. . . . This diet contained 140 Gm. of protein." (Clowes, G. H. A., Jr.; Lund, C. C. and Levenson, S. M.: *The Surface Treatment of Burns*, Ann. Surg. 118:761 [Nov.] 1943.)

"... at least from 200 to 300 grams of protein is needed for replacement alone. One must give the patient as much food as he can take . . . give him a good protein, one that contains all of the essential amino acids." (Elman, R.: *Physiologic Problems of Burns*, J. Missouri M. A. 41:1 [Jan.] 1944.)



The Seal of Acceptance denotes that the nutritional statements made in this advertisement are acceptable to the Council on Foods and Nutrition of the American Medical Association.

AMERICAN MEAT INSTITUTE

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• New Machines and Gadgets •

❁ **WINDOW SCREENS**, made of an open-mesh fabric comprising yarns and threads of high-tenacity cellulose acetate material, are flexible and durable. They are woven into any desired pattern, and water-proofed.

Science News Letter, August 26, 1944

❁ **WRAPPING TAPE**, for bundles or for holding dressings on body wounds, is a continuous strip of non-adhesive fabric which has at regular intervals adhesive sections folded back on themselves. In application as the tape is pulled these folded-back sections straighten out and stick.

Science News Letter, August 26, 1944

❁ **ELECTRICALLY** heated tank for melting, heating and dipping ethyl cellulose plastics, newly developed, uses an agitated hot oil bath that completely surrounds the material underneath, above and around it. Automatic control holds the oil at desired temperature.

Science News Letter, August 26, 1944

❁ **PIVOT-TYPE** ball bearings for precision equipment are now made with outside diameter as little as two millimeters. Each bearing has a cup and four balls made of beryllium, or stainless or chrome steel, and a retaining cap with an opening for the pointed bearing shaft.

Science News Letter, August 26, 1944

❁ **ELECTRIC** junction boxes, made of transparent molded plastic, are light in



weight, safe, and permit inspection without opening. Flat plates, either plastic or metal, are used as bases for the attachment of all wiring. A typical box is shown in the picture.

Science News Letter, August 26, 1944

❁ **MAGNET BRAKE**, recently developed, will stop a one-eighth horsepower motor making 16,000 revolutions per minute in less than six turns, it is claimed. A cork shoe and friction actually do the stopping. Magnetism releases the brake, which remains set until

an electric current is applied to it.
Science News Letter, August 26, 1944

❁ **POLAROID WINDOWS** in post-war airliners will protect the eyes of passengers from sun glare. Circular windows will consist of two panes of glass, one over the other, and both with parallel lines of crystals running through them which block the transmission of light. Rotating one pane varies the light intensity.

Science News Letter, August 26, 1944

❁ **IMPROVED TUNGSTEN** filament for infra-red lamps burns at a lower color temperature, it is claimed, and reduces the spectral glow. The shape of the filament eliminates cold spots and assists focussing.

Science News Letter, August 26, 1944

If you want more information on the new things described here, send a three-cent stamp to **SCIENCE NEWS LETTER**, 1719 N St., N. W., Washington 6, D. C., and ask for Gadget Bulletin 222.

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Question Box

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